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EXAMINER	
STEVENS, BRIAN J	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,756	SEO ET AL.	
	Examiner	Art Unit	
	Brian J. Stevens	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 8, 10, 12, 14, 16-38* is/are rejected.

7)☒ Claim(s) *5-7,9,11,13 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/29/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 5-7, 9, 11, 13, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Objections

2. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The

disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because words such as "beat position" and run on sentences are used, correct English is required. Correction is required. See MPEP § 608.01(b).

5. A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The substitute specification filed must be accompanied by a statement that it contains no new matter.

6. The disclosure is objected to because of the following informalities: on page 2, line 5, the word "the" is misspelled as "he". Appropriate correction is required.

7. The disclosure is objected to because of the following informalities: Figures 1-8 are not described in detail that would give a background as to how the QAM constellation is formed. Appropriate correction is required.

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 33-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Figure 15, which depicts the apparatus to demodulate a QAM signal claimed in claims 33-38, is not disclosed with the necessary explanation of parts shown in order for one of ordinary skill in the art to make and/or use the invention.

11. Claim 8 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The expression 24 that is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

12. Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The expressions 30 and 32 that are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. The terms "first form" and "second form" in claims 10, 12, 14, 16-32 are relative terms which render the claim indefinite. The terms "first form" and "second form" are

not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Depending on which path was chosen first, would determine which "form" is taken, since the option is given, the first form and second form are arbitrary labels. Since the different "forms" have different values associated with the preceding method of determine the vector.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-4, 10, 23, and 33-38 are rejected under 35 U.S.C. 102 (b) as being anticipated by US 6,507,619 B1 by Thomson et al.

17. Regarding claim 1, Thomson teaches a soft decision method for demodulating a received signal (See Column 1, Lines 8-11) of a square Quadrature Amplitude Modulation (QAM) (See Figure 5) consisted of an in-phase signal component and a quadrature phase signal component (See Column 5, Line 2):

wherein a conditional probability vector value being each soft decision value corresponding to a bit position of a hard decision (See Column 6, Lines 9-38, where bits 0 through 3 are found with a soft decision for a conditional vector) is obtained using a function including a conditional determination operation from the quadrature phase

component and the in-phase component of the received signal (See Column 6, Lines 9-38, where both I and Q are used with a conditional determination operation with greater then and less then).

18. Regarding claim 2, Thomson taught the method according to claim 1, as described above. Thomson further teaches wherein the conditional probability vector decision method for a first half of total bits is the same as the decision method for the remaining half of bits, which is determined by substituting the quadrature phase component value and the in-phase component value each other (See Column 6, Lines 9-38, where the method to determine bits 0 and 1 use the same decision method as bits 2 and 3, but instead I is swapped for Q).

19. Regarding claim 3, Thomson taught the method according to claim 2 as described above. Thomson further teaches wherein the conditional probability vector values corresponding to a first to nth bit are demodulated by one of the received signal alpha and beta, (See Column 6, Lines 9-38, where bits 0 to 1, thus first to the nth bits, are demodulated by one of the received signals alpha, I) and the conditional probability vector values corresponding to the (n+1)th to 2nth bits of the second half are demodulated by the remaining received signal (See Column 6, Lines 9-38, where bits 2 to 3, thus (n+1)th to 2nth bits, are demodulated by one of the received signals alpha, Q), and equation applied for the two demodulations has the same method in the first half and the second half (See Column 6, Lines 9-38, where the method to determine bits 0

and 1 use the same decision method as bits 2 and 3, but instead I is swapped for Q, thus either alpha or beta could be used).

20. Regarding claim 4, Thomson taught the method according to claim 2, as described above. Thomson further teaches wherein the demodulation method of the conditional probability vector corresponding to an odd-ordered bit is the same as a calculation method of the conditional probability vector corresponding to the next even-ordered bit, where the received signal value used to calculate the conditional probability vector corresponding to the odd-ordered bit uses one of the alpha and beta according to a given combination constellation diagram and the received signal value for the even-ordered bit uses the remaining one, (See Column 6, Lines 9-38, where the description is for QAM of 16, while if the description was for QAM 4, then the first bit, 1 (odd), would use the same equation as the second bit, 2 (Even), just with a swap between the I and Q signals).

21. Regarding claim 10 and 23, Thomson taught the method according to claim 4 as described above. Thomson further teaches wherein the second conditional probability vector of the second form is calculated by substituting the received value selected in the method for obtaining the first conditional probability vector of the second form with the received value that is not selected in the method (See Column 6, Lines 9-38, where the description is for QAM of 16, while if the description was for QAM 4, then the first bit, 1

(first vector), would use the same equation as the second bit, 2 (second vector), just with a swap between the I and Q signals since I was first used.)

22. Regarding claim 33, Thomson teaches an apparatus for demodulating an QAM receiving signal (See Column 1, Lines 8-11) consisted of an in-phase signal component and a quadrature phase signal component (See Column 5, Line 2), wherein the apparatus comprises a conditional probability vector determination unit (See Column 6, Lines 9-10, if they are being derived, a unit is used to make these bitwise soft decision metrics) for obtaining a conditional probability vector value being each soft decision value corresponding to a bit position of a hard decision (See Column 6, Lines 9-38, where bits 0 through 3 are found with a soft decision for a conditional vector) is obtained using a function including a conditional determination operation from the quadrature phase component and the in-phase component of the received signal (See Column 6, Lines 9-38, where both I and Q are used with a conditional determination operation with greater then and less then).

23. Regarding claim 34, Thomson taught the apparatus according to claim 33, as described above. Thomson further teaches wherein in the conditional probability vector determination unit, an operation for determining the conditional probability vector for a first half of total bits is the same as operation for determining the conditional probability vector for the remaining half of bits, which is determined by substituting the quadrature phase component value and the in-phase component value, respectively (See Column

6, Lines 9-38, where the method to determine bits 0 and 1 use the same decision method as bits 2 and 3, but instead I is swapped for Q).

24. Regarding claim 35, Thomson taught the apparatus according to claim 33, as described above. Thomson further teaches wherein in the conditional probability vector operation unit, the conditional probability vector values corresponding to a first to nth bit are demodulated by one of the received signals alpha and beta, (See Column 6, Lines 9-38, where bits 0 to 1, thus first to the nth bits, are demodulated by one of the received signals alpha, I) and the conditional probability vector values corresponding to the (n+1)th to 2nth bits of the second half are demodulated by the remaining received signal (See Column 6, Lines 9-38, where bits 2 to 3, thus (n+1)th to 2nth bits, are demodulated by one of the received signals alpha, Q), and equation applied for the two demodulations has the same method in the first half and the second half (See Column 6, Lines 9-38, where the method to determine bits 0 and 1 use the same decision method as bits 2 and 3, but instead I is swapped for Q, thus either alpha or beta could be used).

25. Regarding claim 36, Thomson taught the apparatus according to claim 33, as described above. Thomson further teaches wherein in the conditional probability vector operation unit, the demodulation operation of the conditional probability vector corresponding to an odd-ordered bit is the same as a calculation method of the conditional probability vector corresponding to the next even-ordered bit, where the

received signal value used to calculate the conditional probability vector corresponding to the odd-ordered bit uses one of the alpha and beta according to a given combination constellation diagram and the received signal value for the even-ordered bit uses the remaining one, (See Column 6, Lines 9-38, where the description is for QAM of 16, while if the description was for QAM 4, then the first bit, 1 (odd), would use the same equation as the second bit, 2 (Even), just with a swap between the I and Q signals).

26. Regarding claim 37, Thomson taught the apparatus according to claim 34, as described above. Thomson further teaches wherein in the conditional probability vector operation unit, the conditional probability vector values corresponding to a first to nth bit are demodulated by one of the received signals alpha and beta, (See Column 6, Lines 9-38, where bits 0 to 1, thus first to the nth bits, are demodulated by one of the received signals alpha, I) and the conditional probability vector values corresponding to the (n+1)th to 2nth bits of the second half are demodulated by the remaining received signal (See Column 6, Lines 9-38, where bits 2 to 3, thus (n+1)th to 2nth bits, are demodulated by one of the received signals alpha, Q), and equation applied for the two demodulations has the same method in the first half and the second half (See Column 6, Lines 9-38, where the method to determine bits 0 and 1 use the same decision method as bits 2 and 3, but instead I is swapped for Q, thus either alpha or beta could be used).

27. Regarding claim 38, Thomson taught the apparatus according to claim 34, as described above. Thomson further teaches wherein in the conditional probability vector operation unit, the demodulation operation of the conditional probability vector corresponding to an odd-ordered bit is the same as a calculation method of the conditional probability vector corresponding to the next even-ordered bit, where the received signal value used to calculate the conditional probability vector corresponding to the odd-ordered bit uses one of the alpha and beta according to a given combination constellation diagram and the received signal value for the even-ordered bit uses the remaining one, (See Column 6, Lines 9-38, where the description is for QAM of 16, while if the description was for QAM 4, then the first bit, 1 (odd), would use the same equation as the second bit, 2 (Even), just with a swap between the I and Q signals).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Stevens whose telephone number is (571)270-3623. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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